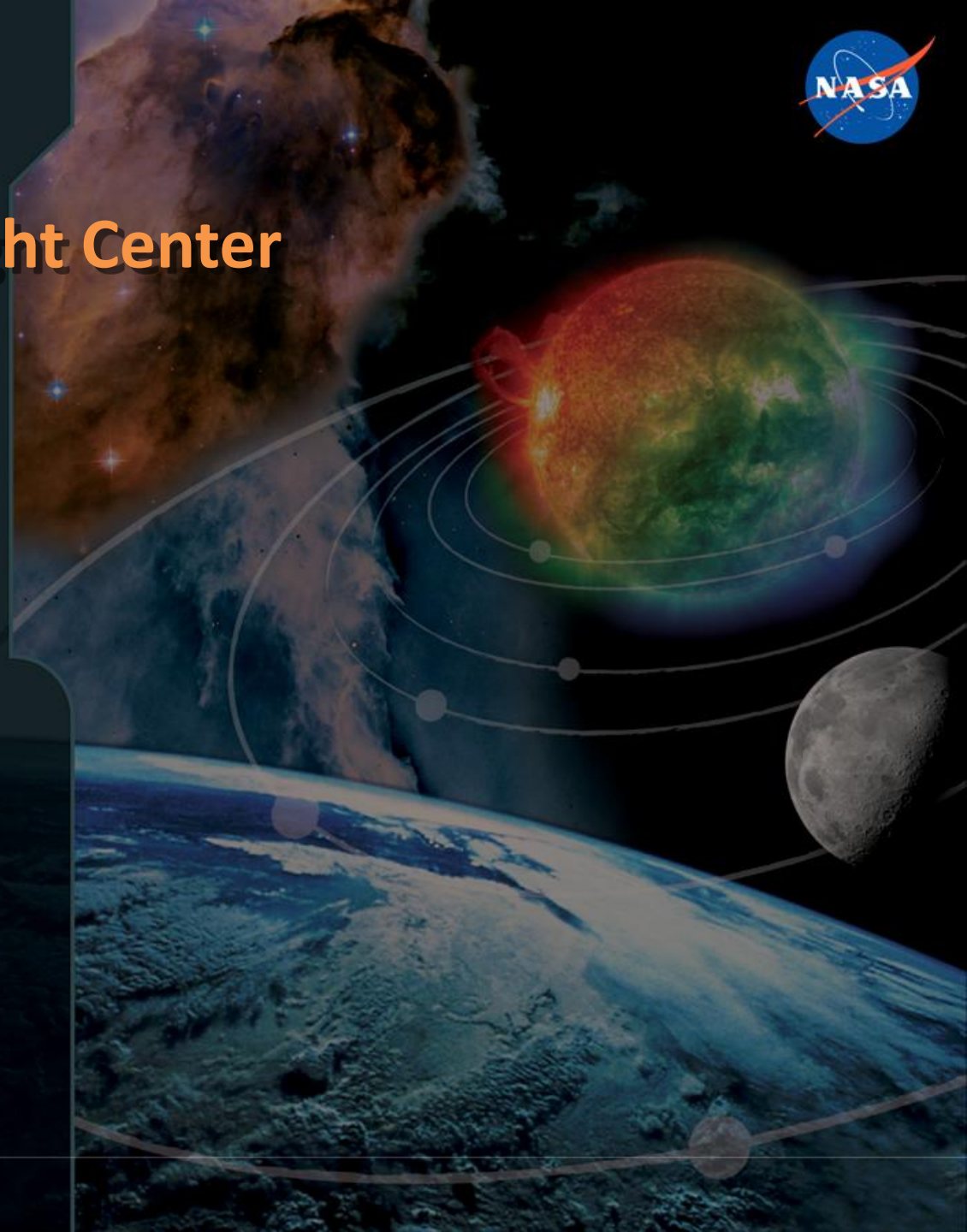




Goddard Space Flight Center

NASA
Goddard
SPACE FLIGHT CENTER
www.nasa.gov/goddard

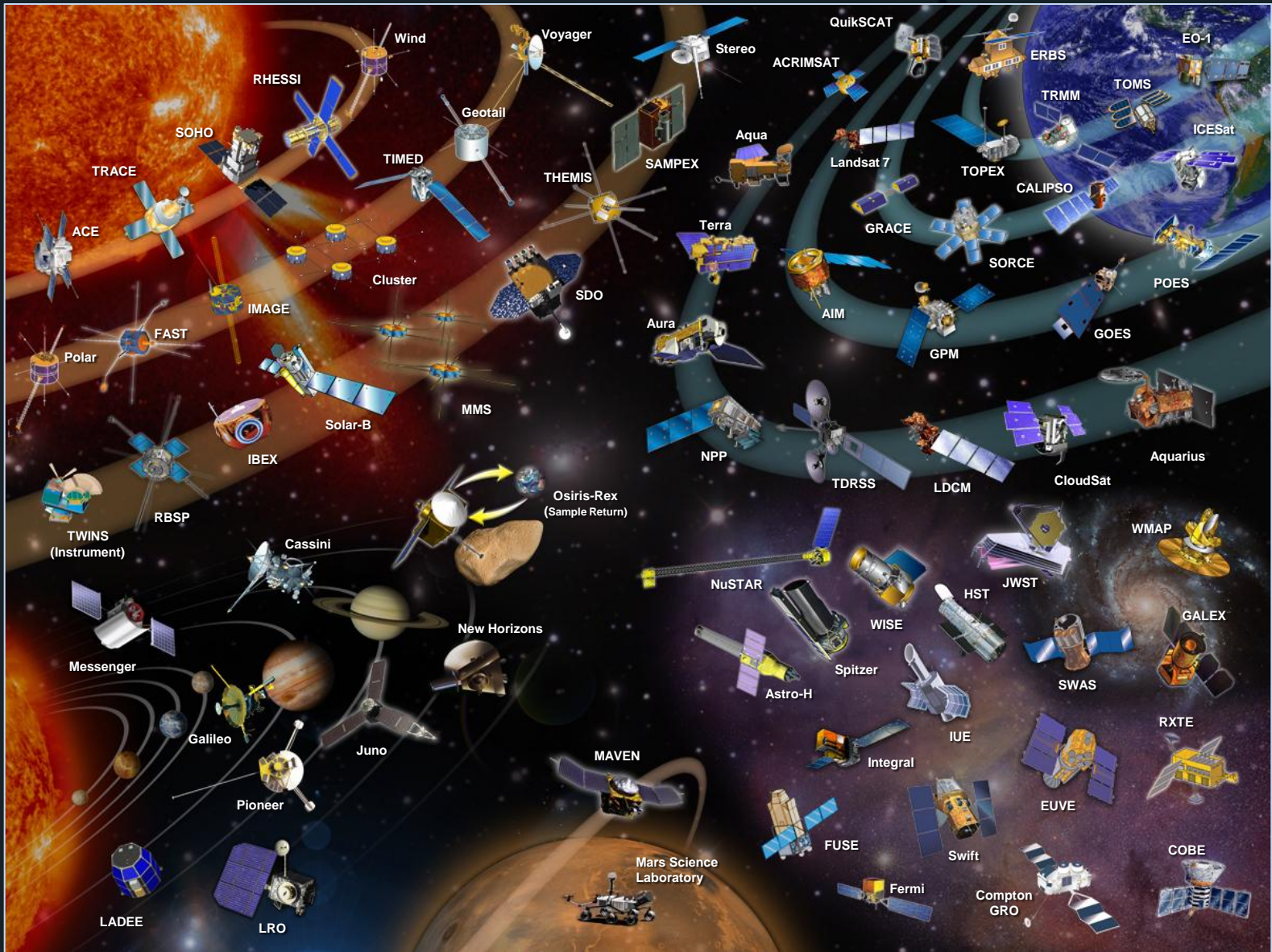


NASA Goddard Space Flight Center

- NASA's first Space Flight Center (established 1959)
- We TRANSFORM Human Understanding of Earth and Space
- Largest Collection of Scientists & Engineers in the U.S.
- Nearly 300 successful missions including the World's First Weather Satellite and the Hubble Space Telescope
- 2006 Nobel Prize in Physics [Big Bang/Cosmic Background]
- Hubble Supported 2011 Nobel Prize in Physics
- WMAP Team Awarded 2012 Gruber Prize for Cosmology



GSFC's Contributions to a Diverse Mission Portfolio



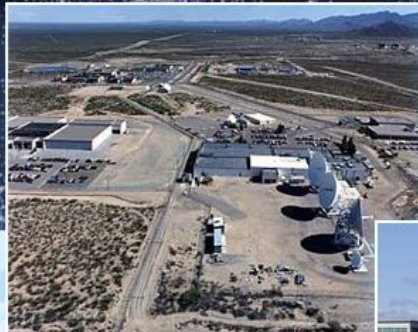
Our Facilities

- GSFC Greenbelt, Maryland
- GSFC Wallops Flight Facility, Virginia
- IV&V Facility, West Virginia
- Goddard Institute for Space Studies, New York
- Ground Stations at White Sands Complex, New Mexico



Greenbelt

White Sands Complex



Wallops Flight Facility



Goddard Institute for
Space Studies



Independent Verification and
Validation Facility



NASA GSFC Leadership Team



Chris Scolese
Director



Kelly Farrell,
Chief of Staff



Rick Obenschain,
Deputy Director



Christyl Johnson,
Deputy Director
For Technology and
Research Investments



Colleen Hartman,
Deputy Director for
Science, Operations and
Program Performance



Nancy Abell,
Associate Director



Ron Brade,
Director,
Office of
Human Capital
Management



Julie Baker,
Chief Financial
Officer



Ray Rubilotta,
(Acting)
Director,
Management
Operations
Directorate



Judy Bruner,
Director,
Office of
Systems Safety
and Mission
Assurance



George Morrow,
Director,
Flight Projects
Directorate



Dennis Andrucyk,
Director,
Applied Engineering
and Technology
Directorate



Nick White,
Director,
Sciences and
Exploration
Directorate



Adrian Gardner,
Director,
Information
Technology and
Communications
Directorate



Bill Wrobel,
Director,
Suborbital and
Special Orbital
Projects
and WFF



Phillina Tookes
(Acting)
Government and
Community Relations
Manager



Dan Krieger,
Special Assistant
for Diversity



Veronica Hill,
Chief,
Equal Opportunity
Programs Office



Mark Hess,
Chief,
Office of
Communications



Andrew Falcon,
Chief
Counsel



Bob Gabrys,
Director,
Office of
Education
Programs



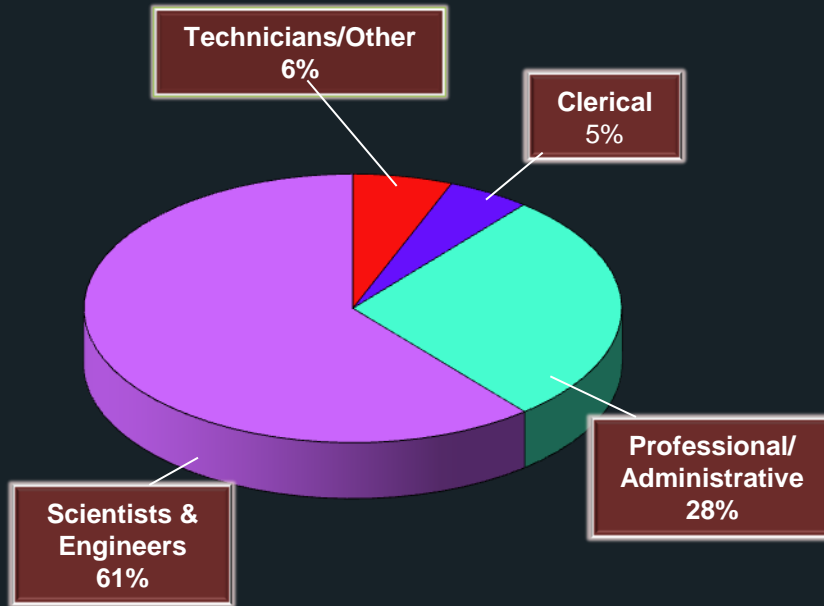
Greg Blaney,
Director,
Independent
Verification and
Validation Facility
WV



Mike McGrath,
Director,
Office of
Procurement

* Reports
directly to NASA
Headquarters

Our People

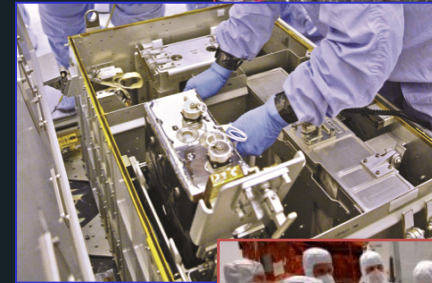
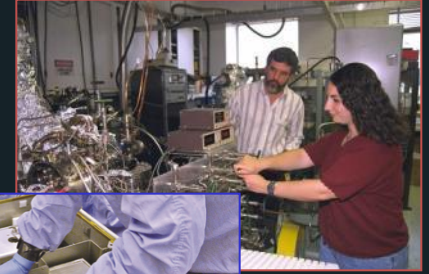


GSFC Workforce

Total Civil Servants: 3,400

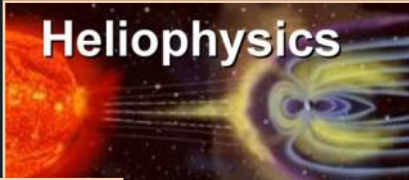
Total Contractors : 6,400

Total Workforce: 9,800



Our Lines of Business

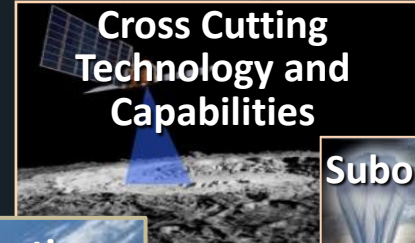
Heliophysics



Earth Science



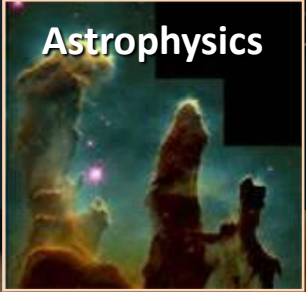
Cross Cutting Technology and Capabilities



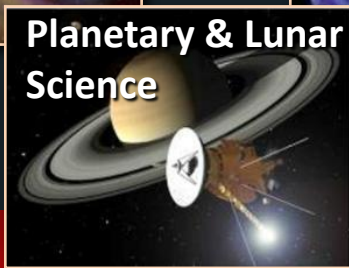
Suborbital Platforms



Astrophysics



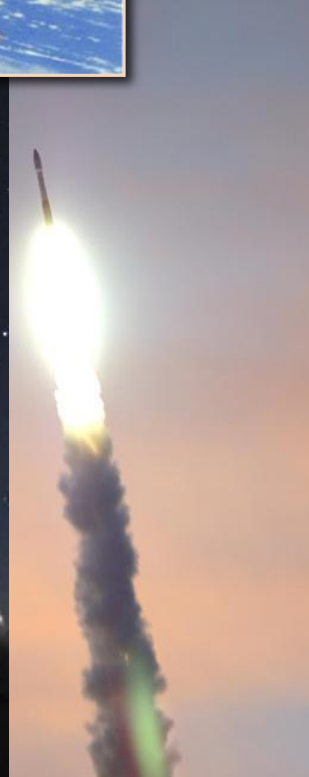
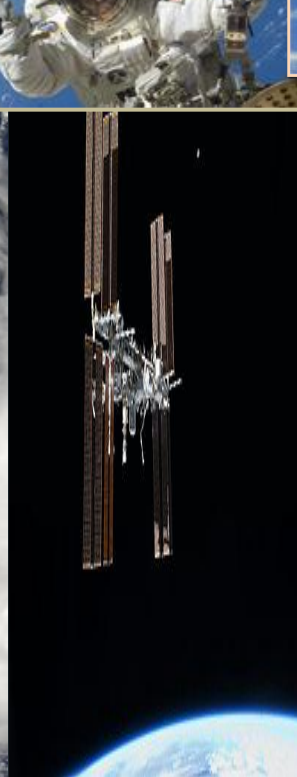
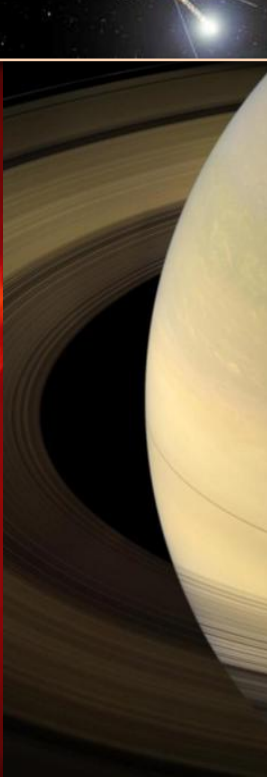
Planetary & Lunar Science



Human Exploration & Operations



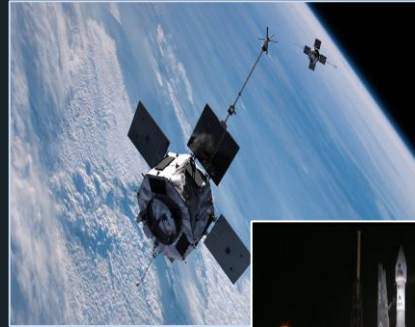
Communications & Navigation



Recent Accomplishments



Sample Analysis at Mars
Instrument on MSL



Van Allen
Probes



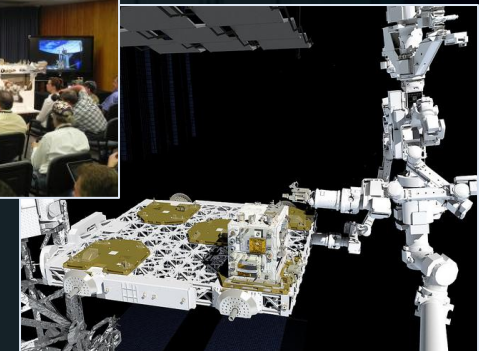
Suomi NPP –
Revisiting the Blue
Marble



Operation
Icebridge



HS3



Robotic Refueling
Mission on STS-135

Upcoming Milestones



**Antares test launch
from Wallops
Early 2013**



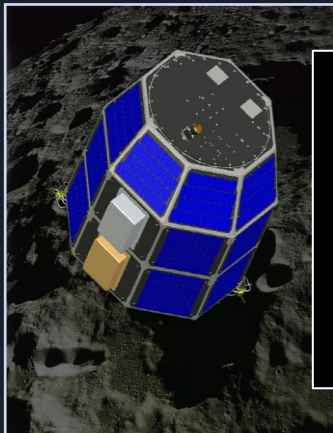
**TDRS K Launch
January 2013**



**LDCM Launch
February 2013**



**Numerous
Suborbital
Missions**



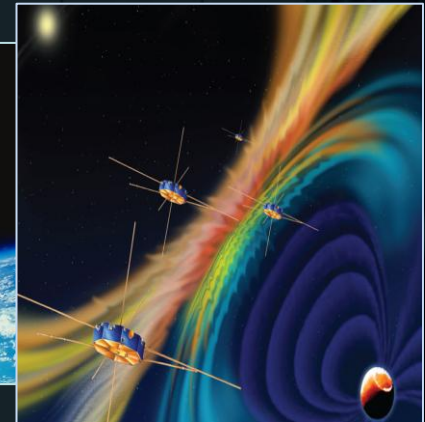
**LADEE Launch
August 2013**



**MAVEN Launch
November 2013**

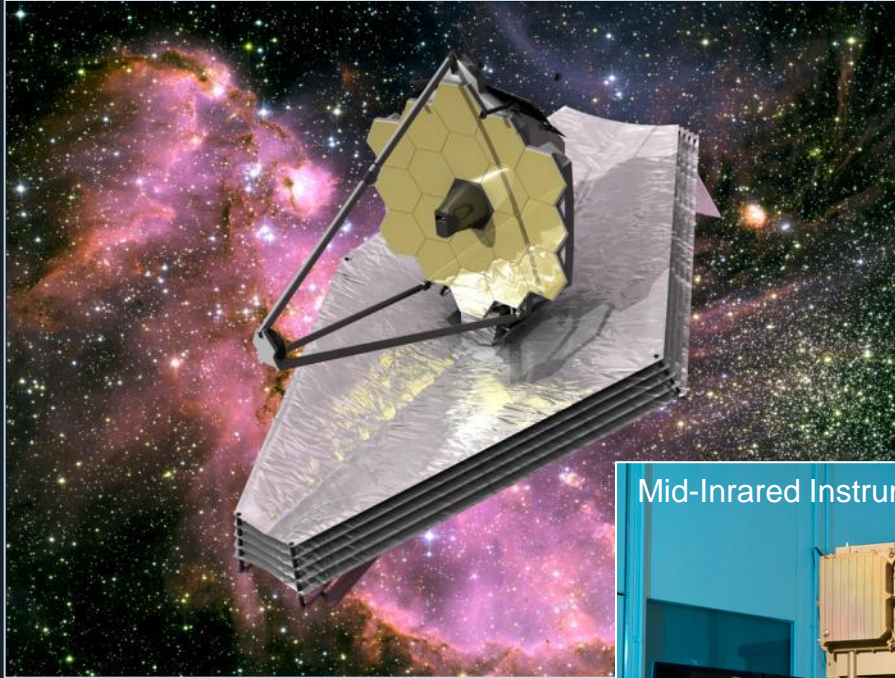


**GPM Launch
February 2014**



**MMS Launch
October 2014**

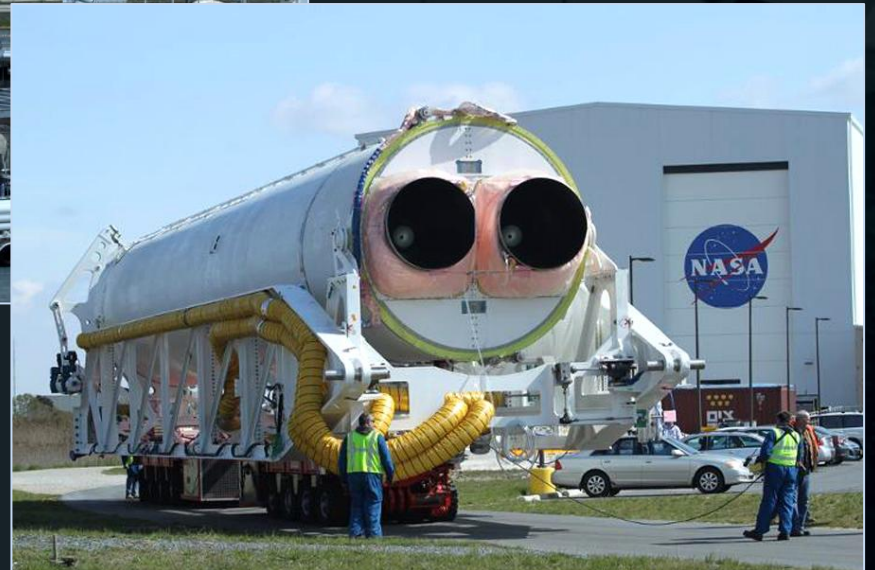
James Webb Space Telescope



Mid-Infrared Instrument (MIRI)



Antares at Wallops



NOAA Reimbursable Projects

JPSS

December 2016



DSCOVR
June 2014

GOES-R
October
2015



Forecasts of Hurricane Sandy without polar satellites

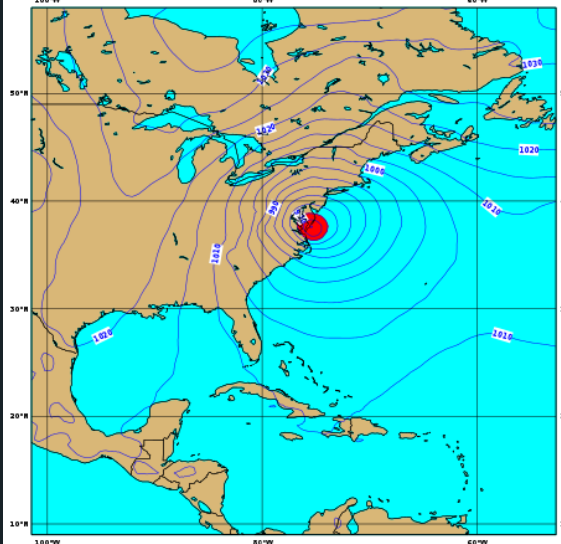
European Center for Mid-Range Weather Forecasting (ECMWF) forecasts of Mean Sea Level Pressure, **5 days in advance** of the 30th October 2012 for the landfall of Hurricane Sandy. Forecasts from an assimilation system with no polar satellites fail to predict the landfall of the storm on the US east coast.

ECMWF OPS

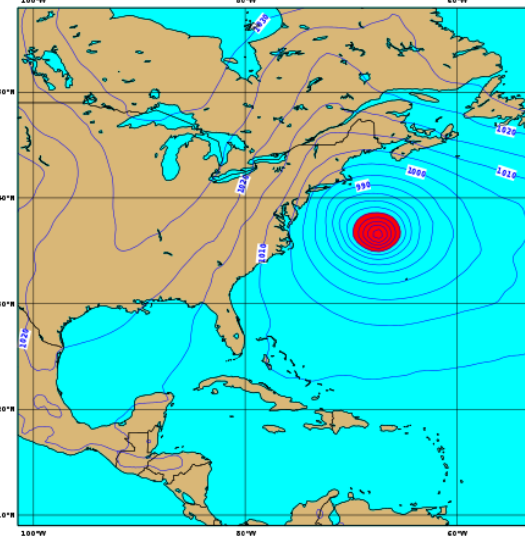
NO POLAR SAT

VERIFICATION

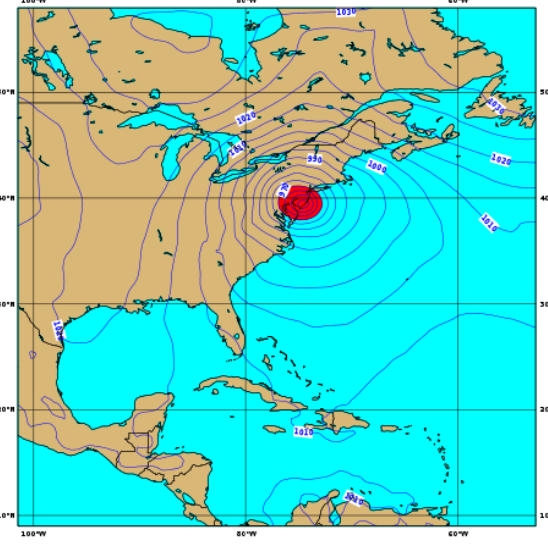
Thursday 25 October 2012 00 UTC ECMWF Forecast t+120 VTC Tuesday 30 October 2012 00 UTC surface Mean sea level pressure



Thursday 25 October 2012 00 UTC ECMWF Forecast t+120 VTC Tuesday 30 October 2012 00 UTC surface Mean sea level pressure



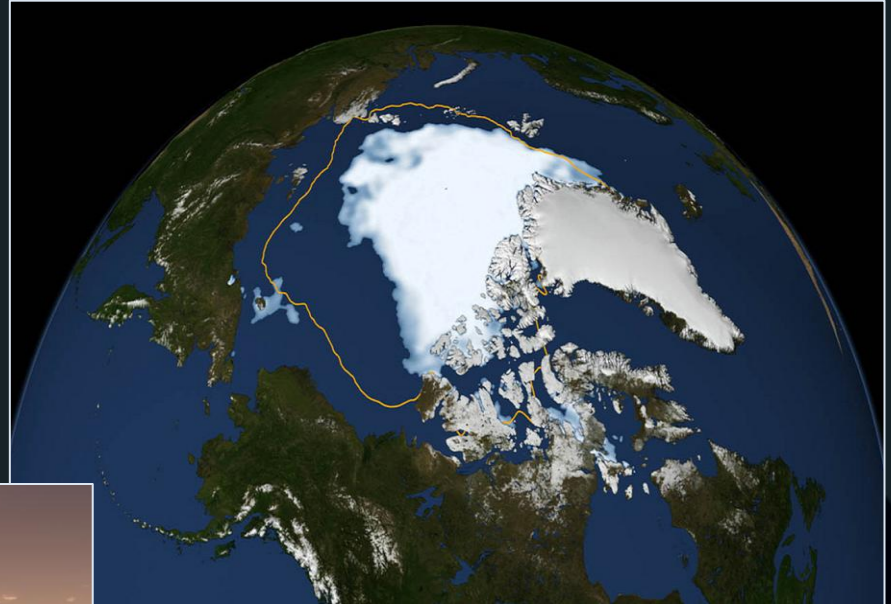
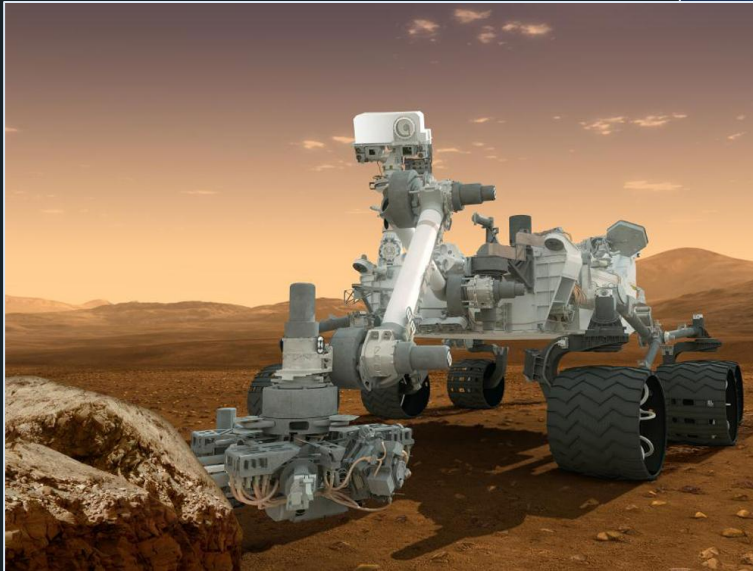
Tuesday 30 October 2012 00 UTC ECMWF Forecast t+0 VTC Tuesday 30 October 2012 00 UTC surface Mean sea level pressure



5 day forecast: Base time 2012-10-25-00z **Valid Time: 2012-10-30-00z**

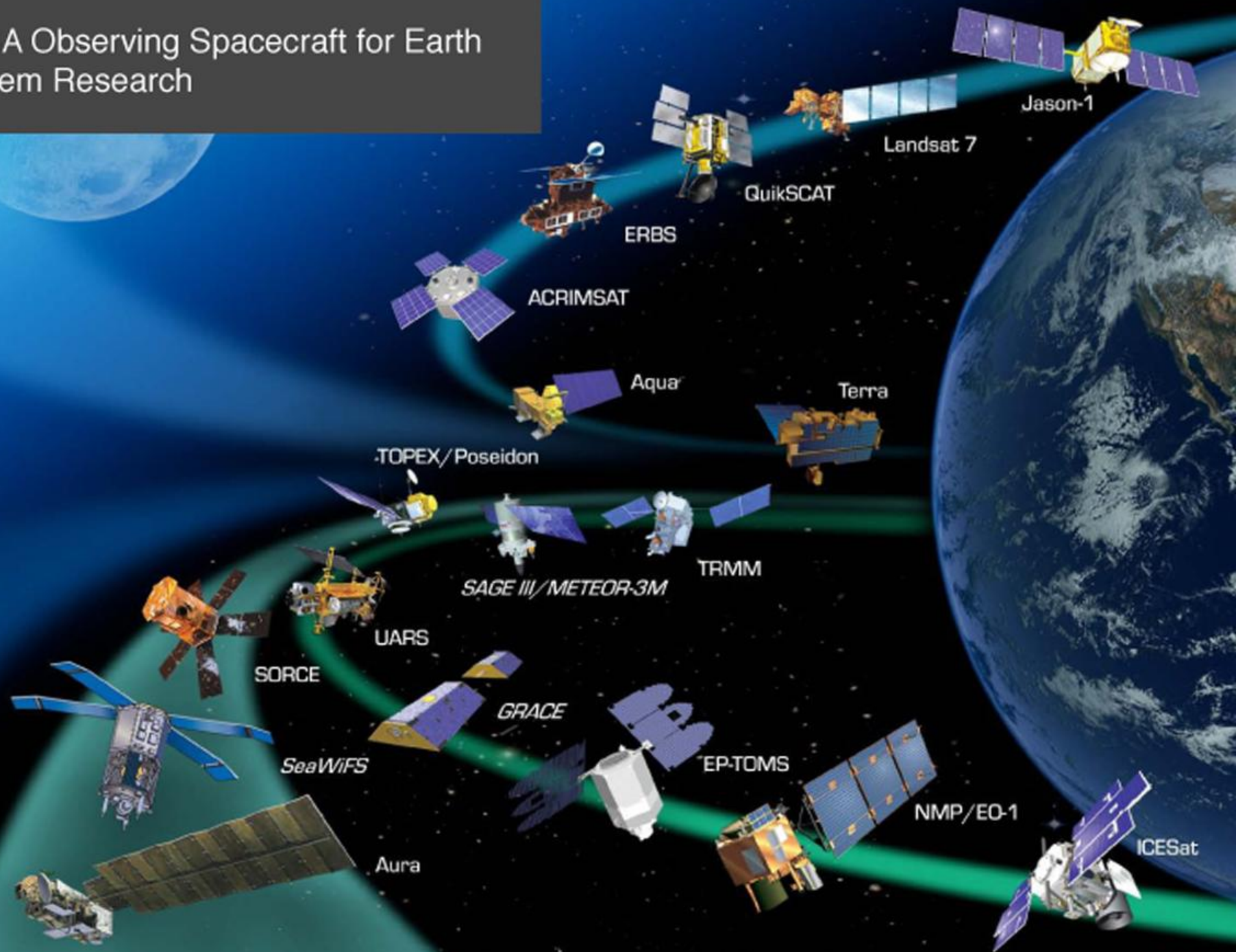
Answering Some the BIG Questions

The Climate Imperative



The Search for Life

NASA Observing Spacecraft for Earth System Research



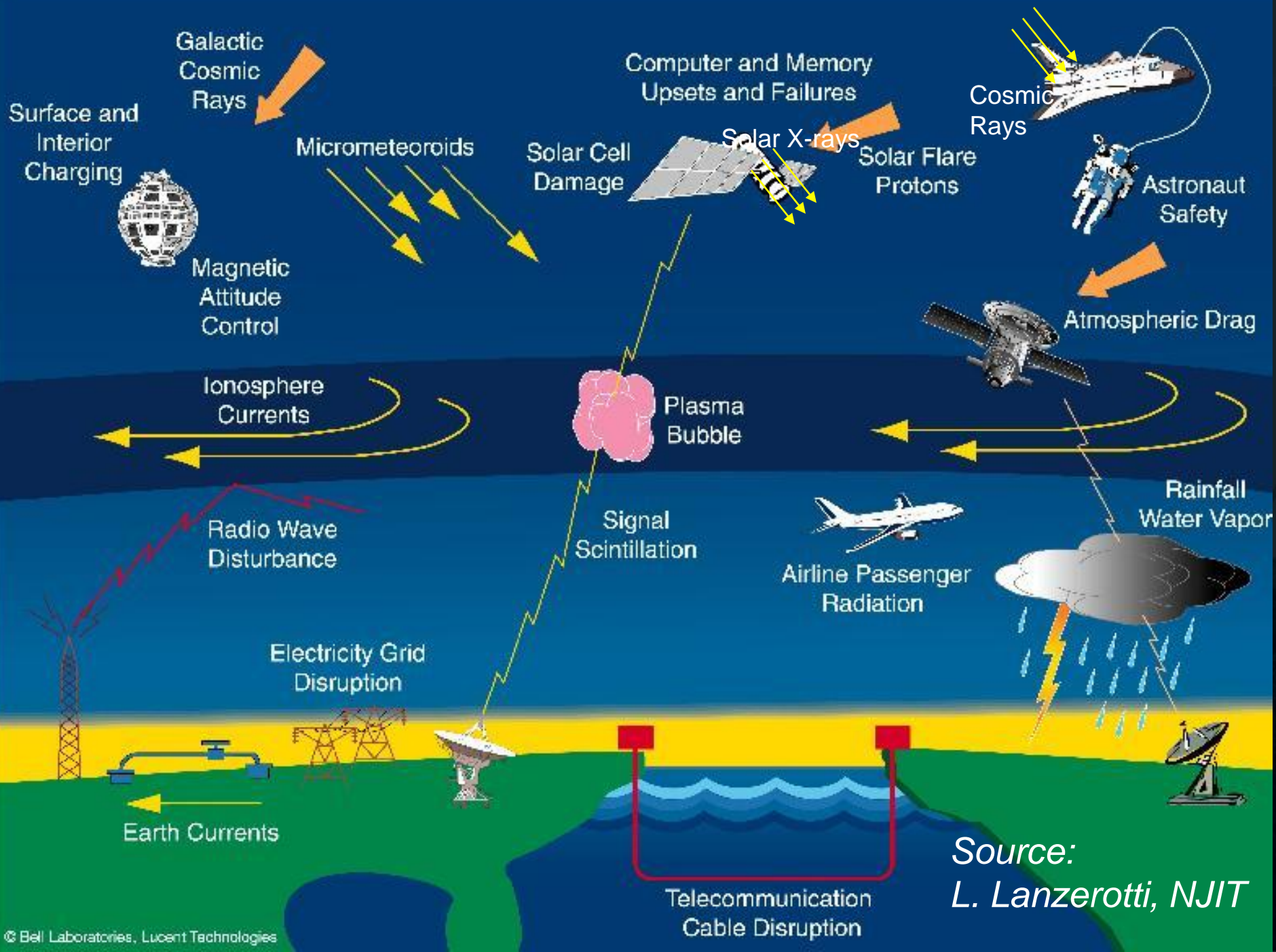
Why We Study the Earth – the Global View

The Intergovernmental Panel on Climate Change (IPCC), which includes more than 1,300 scientists from the United States and other countries, forecasts a temperature rise of 2.5 to 10 degrees Fahrenheit over the next century.

Global climate change already has observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner.

Climate change effects that scientists had previously predicted are now occurring: loss of sea ice, accelerated sea level rise, larger and more intense storms, longer and more intense heat waves.





Source:
L. Lanzerotti, NJIT

North America: Decreasing snowpack in the western mountains; 5-20 percent increase in yields of rain-fed agriculture in some (northern) regions; increased frequency, intensity and duration of heat waves in cities that currently experience them

Europe: Increased risk of inland flash floods; more frequent coastal flooding and increased erosion from storms and sea level rise; glacial retreat in mountainous areas; reduced snow cover and winter tourism; extensive species losses; reductions of crop productivity in southern Europe.

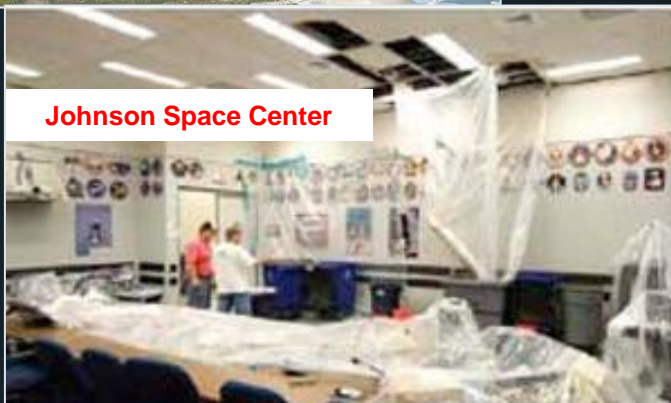
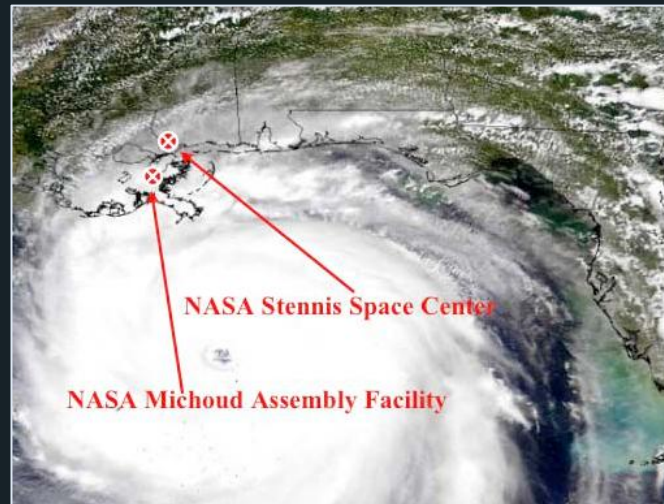
Asia: Freshwater availability will decrease; coastal areas will be at risk due to increased flooding; death rate from disease associated with floods and droughts expected to rise in some regions.

Latin America: Gradual replacement of tropical forest by savannah in eastern Amazonia; risk of significant biodiversity loss through species extinction in many tropical areas; significant changes in water availability for human consumption, agriculture and energy generation

Africa: By 2020, many millions of people will be exposed to increased water stress; reduced agricultural productivity, access to food may be severely compromised.

Why We Study the Earth – the NASA View

Over 2/3rds of all NASA's constructed real property value is within 16 feet of sea level (≈\$20B)!



What are the conditions for habitability, and could there be life on other worlds?

Engaging all themes:

Heliophysics:

Determine the impact of the Sun and its dynamics on Earth's habitability [SDO, SP+]

Solar System:

Assess current environmental conditions and investigate history of habitability in promising settings [MSL Curiosity]

Earth Sciences:

Discover the signatures and impact of life on Earth [OCO, DESDynI, ASCENDS]

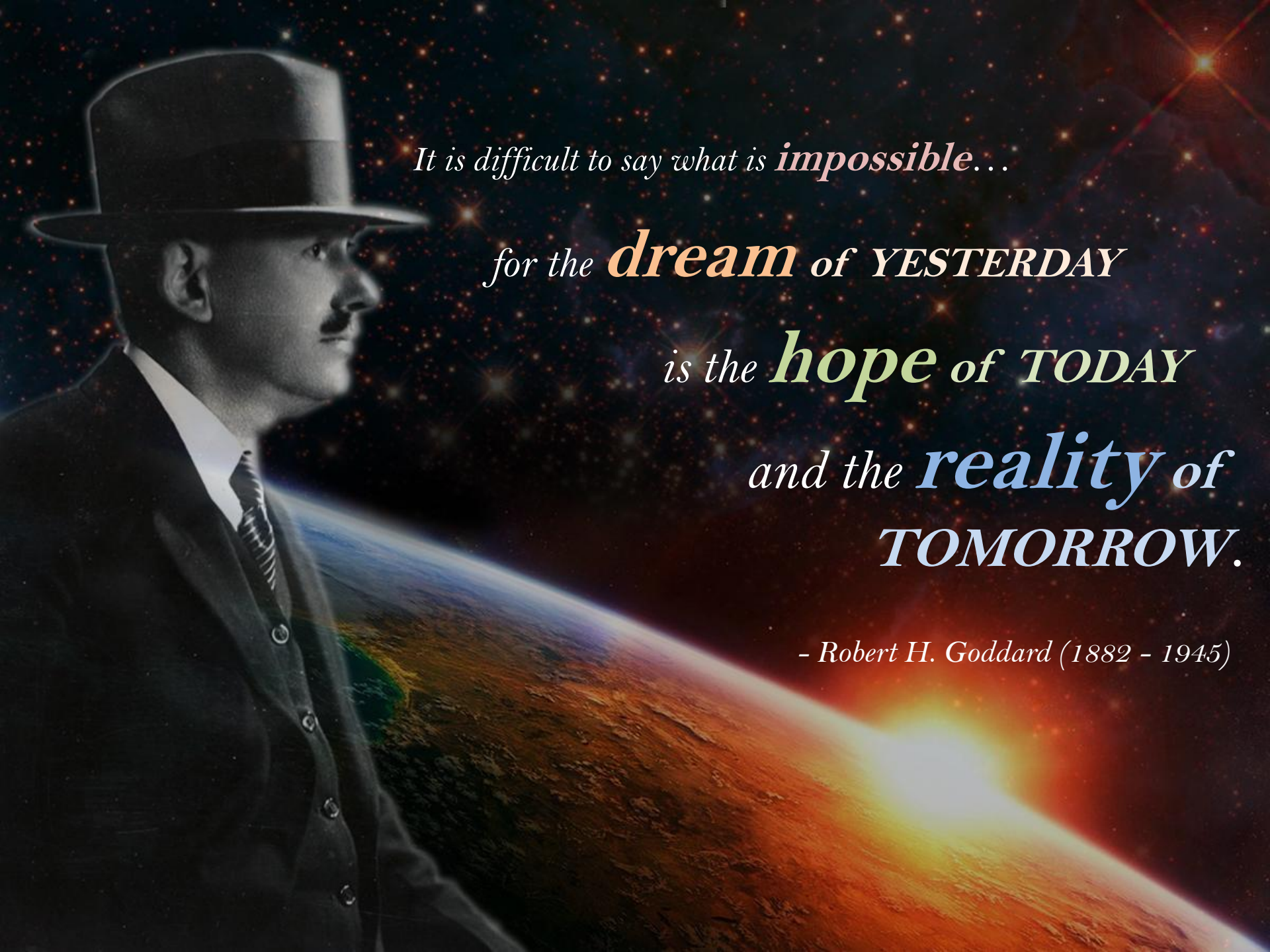
Astrophysics:

Characterize terrestrial exoplanets, exoplanetary systems, and search for biosignatures in exoplanet atmospheres [JWST]

RESULT...



The processes and conditions that enable life to arise and persist



*It is difficult to say what is **impossible**...*

*for the **dream** of YESTERDAY*

*is the **hope** of TODAY*

*and the **reality** of
TOMORROW.*

- Robert H. Goddard (1882 - 1945)